

and, as will be seen, all but one of the 27 native species and subspecies which have been studied contain some substance from which methyl salicylate is readily set free. No laboratory studies have been made upon these, although there seems no reason to doubt that the glucoside gaultherin is the primary source. The one exceptional species, *P. cymosa*, has seeds rather dissimilar from those of the others in its section, and is probably not very closely related to them.

There are three plants of other families, in which the same phenomenon can be observed, growing more or less commonly in the region covered, namely Sweet Birch (*Betula lenta*), Wintergreen (*Gaultheria procumbens*), and American Field-Violet, (*Viola rafinesquii*). The presence of methyl salicylate in the last does not seem to have been hitherto recorded, but it is interesting to note that some European violets are known to contain gaultherin, and possibly other American species may be found to do so.

BOTANY.—*The Central American species of Hydrocotyle.*<sup>1</sup> J. N. ROSE and PAUL C. STANDLEY, U. S. National Museum.

The genus *Hydrocotyle* is a small group of the family Apiaceae or Umbelliferae, widely distributed in both hemispheres, and in both North and South America. Although some species grow in the tropical lowlands, most of them are natives of the temperate regions, and in the countries lying near the equator the Hydrocotyles are best represented in the cool mountains. The Central American species have not been revised recently, and, indeed, a satisfactory treatment of them would have been impossible for lack of adequate material. Recent explorations in Central America, particularly in Costa Rica, have resulted in assembling a large number of specimens, so that it is now possible to understand the various forms represented in the region. Of the eight species which we have recognized from the Central American area no less than four appear to be new, and they are here described. It is altogether possible that further exploration may reveal the occurrence of still other localized species, like *H. ribifolia* and *H. Torresiana*, each of which, although represented by several collections, is known from only a single limited locality.

#### KEY TO SPECIES

Leaves peltate.

Umbels compound . . . . . 1. *H. bonariensis*.

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Umbels simple.

Petioles glabrous; pedicels usually much longer than the fruit; lateral ribs of the fruit evident.....2. *H. umbellata*.

Petioles villous; pedicels shorter than the fruit; lateral ribs nearly obsolete.....3. *H. costaricensis*.

Leaves not peltate.

Petioles glabrous; leaves deeply lobed, the lobes very obtuse.

4. *H. ranunculoides*.

Petioles villous or puberulent; leaves not lobed or, if lobed, the lobes acute.

Leaves angulate-lobed, the lobes elongate, acute or acutish.

5. *H. ribifolia*.

Leaves orbicular, not lobed or with very shallow, broadly rounded lobes.

Flower sessile.....6. *H. Torresiana*.

Flowers on evident pedicels.

Peduncles densely puberulent; pedicels usually longer than the fruit, often several times as long.....7. *H. mexicana*.

Peduncles thinly villous; pedicels equaling or shorter than the fruit.....8. *H. Maxonii*.

1. *Hydrocotyle bonariensis* Lam. Encycl. 3: 153. 1789.

GUATEMALA: Lake Amatitlán, *J. D. Smith* 2200. Without definite locality, *Watson* 36a.

PANAMA: Chagres, *Fendler* 132.

2. *Hydrocotyle umbellata* L. Sp. Pl. 234. 1753.

GUATEMALA: Laguna de Caldera, Volcán de Pacaya, *Tonduz* 476. Near Guatemala, *Tonduz* 813. Puerto Barrios, *Deam* 6013. Amatitlán, *J. D. Smith* 2668. San Lucas Tolimán, *Holway* 190. Finca Sepacuité, *Cook & Griggs* 187. Santa Rosa, *Heyde & Lux* 3349.

SALVADOR: Ixtepeque, *Standley* 21458. Ateos, *Standley* 23366.

HONDURAS: Amapala, *Standley* 20747.

NICARAGUA: Granada, *Baker* 621.

COSTA RICA: San José, *Holway* 259; *Standley* 32166. Río Reventado, near Cartago, *Standley & Valerio* 49550. Las Cónovas, Prov. Cartago, *Standley* 35984.

PANAMA: Valley of Río Panduro, *Killip* 3577. Matachín to Las Cascadas, *Cowell* 356.

In Costa Rica the plant is called "sombbrero," in Salvador "lechuga."

3. *Hydrocotyle costaricensis* Rose, sp. nov.

Stems very slender, creeping, elongate, sparsely villous with long whitish hairs or glabrate, the nodes 1-3 cm. long; petioles slender, 1-3 cm. long, densely retrorse-villous, at least above, with long white hairs; leaf-blades peltate, orbicular, 1-2 cm. broad, very shallowly crenate-lobate, the lobes crenate, the crenations few, broadly rounded, the blades glabrous on both surfaces; peduncles filiform, 5-10 mm. long, glabrous; flowers few, sessile or on pedicels less than 1 mm. long; petals pink; fruit didymous, nearly 1.5 mm. broad, emarginate at base and apex, turgid, nearly twice as broad as high, glabrous, obscurely tuberculate, the lateral ribs obsolete.

Type in the U. S. National Herbarium, no. 1,180,225, collected on roadside bank near La Palma, Province of San José, Costa Rica, altitude 1,500 to 1,700 meters, July 17, 1923, by William R. Maxon (no. 7902). The following additional collections may be cited:

COSTA RICA: Las Nubes, *Standley* 38402. Without definite locality,

*Pittier* 10353. Santa María de Dota, *Standley* 41572; *Standley & Valerio* 43341. Between San Pedro and Curridabat, *Standley* 32810. San Sebastián, *Standley* 32747. Alto de la Estrella, *Standley* 39291.

PANAMA: Balboa, a weed in garden, doubtless introduced, probably from the mountains of Panama, *Standley* 28563.

*Hydrocotyle costaricensis* is closely related to *H. pusilla* A. Rich., a species of the West Indies and South America. The latter is distinguished by the villous upper surface of the leaves.

4. ***Hydrocotyle ranunculoides*** L. f. *Suppl. Pl.* 177. 1781.

NICARAGUA: Without definite locality, *C. Wright*.

COSTA RICA: La Verbena, *Standley* 32220. Santa María de Dota, *Standley & Valerio* 44136. Río Reventado, near Cartago, *Standley & Valerio* 49626.

PANAMA: Changuinola Valley, *Dunlap* 226.

5. ***Hydrocotyle ribifolia*** Rose & Standl., sp. nov.

Plants large and coarse, prostrate or widely creeping, the stems 30–100 cm. long or more, with elongate internodes, copiously villous with long spreading hairs; stipules 4–5 mm. long, oval or broadly ovate, scarious, glabrous, the margins lacerate; petioles 4–13 cm. long, villous with long slender spreading yellowish hairs; leaf blades pentagonal, 5–9.5 cm. broad, deeply cordate at base, with a deep narrow sinus, 5-lobate to about the middle, the lobes broadly ovate, acute or acutish, shallowly lobate, the lobes irregularly crenate or crenate-serrate, rather densely villous on both surfaces with spreading yellowish hairs; peduncles very slender, 2.5–4.5 cm. long, glabrous; flowers numerous, greenish, the pedicels filiform, 2.5–4 mm. long, glabrous; fruit 1.5 mm. long (one of the carpels usually abortive), shallowly emarginate at base and apex, glabrous, the lateral ribs slender but distinct.

Type in the U. S. National Herbarium, no. 1,253,273, collected in moist forest on Cerro de las Vueltas, Province of San José, Costa Rica, altitude 3,000 meters, December 31, 1925, by Paul C. Standley and Juvenal Valerio (no. 43506). The following collections also represent the species:

COSTA RICA: Cerro de las Vueltas, *Standley & Valerio* 43749, 43799.

This plant is very unlike anything known heretofore from North America, and it does not approach closely any South American species of which material is available.

6. ***Hydrocotyle Torresiana*** Rose & Standl., sp. nov.

Plants slender, creeping, the stems 10–30 cm. long, rooting at the nodes, with elongate internodes, sparsely villous with slender spreading hairs; stipules 2 mm. long, rounded or broadly ovate, scarious, whitish, glabrous, the margin irregularly dentate or lacerate; petioles 2–4 cm. long, slender, thinly villous with long slender spreading hairs; leaf-blades reniform-orbicular, 1–2.5 cm. broad, deeply cordate at base, with a V-shaped sinus, very shallowly 5-lobate, the lobes broad, dentate with short ovate obtuse irregular teeth, short-villous on both surfaces with white hairs; peduncles slender, 1–2.5 cm. long, sparsely villous; flowers sessile or very nearly so, purplish, numerous; fruit heads globose, very dense, 4 mm. in diameter; fruit 1 mm. long, much broader than long, glabrous, the lateral nerves obsolete.

Type in the U. S. National Herbarium, no. 1,226,942, collected in potrero on the southern slope of Volcano of Turrialba, near the Finca del Volcán de Turrialba, Costa Rica, altitude about 2,400 meters, February 22, 1924, by Paul C. Standley (no. 34950). Nos. 35232 and 35105, from the same locality, represent this plant.



The species is named for Prof. Rubén Torres Rojas, in whose company the specimens were collected.

7. *Hydrocotyle mexicana* Cham. & Schlecht. *Linnaea* 5: 208. 1830.

GUATEMALA: Río Negro, Depart. Quiché, *Heyde & Lux* 3350. Volcán Acatenango, *Kellerman* 5244, 4801. Volcán Atitlán, *Kellerman* 5771; *Holway* 189. Cobán, *Tuerckheim* 8688, 685. Between San Martín and Todos Santos, *Nelson* 3623. Volcán Santa María, *Nelson* 3702. Near Secanquím, *Goll* 156.

SALVADOR: Volcán de San Vicente, *Standley* 21488.

NICARAGUA: San Rafael del Norte, *Miller & Griscom* 4, 53, 104.

COSTA RICA: La Palma, *Maxon & Harvey* 8063. Las Nubes, *Standley* 38501, 38617, 38828, 38525. La Hondura, *Standley* 36175; *Standley & Valerio* 51902. Tuis, *Tonduz* 11414. Cerro de la Carpintera, *Standley* 34312. Between Aserri and Tarbaca, *Standley* 34165, 41387. Los Ayotes, *Standley & Valerio* 45387. El Muñeco, *Standley* 33506; *Standley & Torres* 51255. La Estrella, *Standley* 39317, 39177. El Silencio, *Valerio* 56; *Standley & Valerio* 44566. Laguna de la Chonta, *Standley* 42278. Santa María de Dota, *Standley* 42510, 41807, 42110. Pejivalle, *Standley & Valerio* 46740. Yerba Buena, *Standley & Valerio* 49968, 49797. Cerro de las Caricias, *Standley & Valerio* 52064. Quebradillas, *Standley* 42930.

PANAMA: Above El Boquete, *Maxon* 5644. Cana, *Williams* 783.

8. *Hydrocotyle Maxonii* Rose, sp. nov.

Plants slender, creeping, with elongate internodes, the stems rooting at the nodes, glabrous; petioles slender, 3–15 cm. long, sparsely villous with long slender spreading white hairs; leaf-blades orbicular, 1–4 cm. broad, deeply cordate at base, with a narrow V-shaped sinus, sparsely villous on the larger nerves, sometimes glabrous on the upper surface, very shallowly 5-lobate, the lobes broadly rounded, distantly crenate; peduncles slender, 5–16 cm. long, often exceeding the leaves, villous with long spreading white hairs; flowers numerous, greenish, the pedicels 1–1.5 mm. long, glabrous; fruit heads very dense, globose, about 7 mm. in diameter; fruit 1.5 mm. wide, broader than long, somewhat obcompressed, broadly rounded or truncate at base and apex, glabrous, the lateral nerves slender but distinct.

Type in the U. S. National Herbarium, no. 1,180,226, collected on stony wet roadside near La Palma, Costa Rica, altitude 1,500 to 1,700 meters, July 17, 1923, by William R. Maxon and Alfred D. Harvey (no. 8047). The following additional collections have been examined:

MEXICO: Choapam, Oaxaca, *Nelson* 864.

GUATEMALA: Finca Mocca, Alta Verapaz, *Johnson* 54.

COSTA RICA: El Muñeco, *Standley* 33478; *Standley & Torres* 50906. La Palma, *Standley* 33160, 38218, 38112, 32891. La Estrella, *Standley* 39382, 39169. La Colombiana, *Standley* 37302, 36694. Guápiles, *Standley* 37024. Pejivalle, *Standley & Valerio* 46838, 46782. La Hondura, *Standley* 37584, 36147; *Standley & Valerio* 51904. Naranjos Agrios, *Standley & Valerio* 46414. Hamburg Finca, *Standley & Valerio* 48834. Tuis, *Tonduz* 11413. San Pedro, *Tonduz* 17838. Quebrada Gata, *Brenes* 14450. Mountains of Candelaria, Feb., 1847, *Oersted*. Río Reventado near Cartago, *Standley & Valerio* 49562.

Although closely related to *H. mexicana*, this plant is easily distinguished by the characters given in the key. The numerous specimens examined are at once referable to one or the other of the two species, and there are no intermediate forms.